GREMLIN Technology Package

This package is a complete system approach which is designed to
transfer GREMLIN technology in the video game field to another company
already in the video game business. With slight additions, the package
could put a company into the video game business on a minimum time
and expenditure basis.

The package contains the following items, which are explained in detail
on the following pages:

1. The GREMLIN Video Game Development Computer. This is a software
    development system which, in addition to providing fast and efficient
    generation of game software, also contains the exact hardware system
    which is implemented in individual games.

2. License to use, and mechanism to procure at low cost, GREMLIN's
    proprietary integrated circuit which implements all of the video
    control circuitry for a game.

3. A hardware manual which characterizes the custom chip, and illustrates
    its use in systems.

4. Training, to provide understanding necessary to make full use of
    the development system.

5. A set of "game boards" which can be used to construct prototypes and
    field test games developed on the Game Computer System.

Video Game Development Computer

The GREMLIN Video Game Development Computer was developed to provide
a system which ~~could~~ could turn ideas into working video games
in the shortest time possible. The key ingredients of the system which
provide this capability are as follows:

1. An Editor/Assembler which is operator and speed optimized. This
    means that a programmer can enter, debug, and troubleshoot a program
    more rapidly than on any conventional software development system.

2. Graphics hardware built into the development system. This feature
    gives many benefits. Programs which have been written and checked
    out on the Game Development Computer can be directly transfered
    to game logic boards and field tested. This is done using erasable
    memories which the Game Development Computer ~~programs~~ produces.
    Images which will appear on the game screen can be created, ~~and viewed~~
    viewed and modified on the Game Development Computer's own CRT screen.
    using simple keyboard commands.

3. The computer is optimized for a single programmer working on a single
    program at a time. This ~~eliminates~~ approach is feasible because
    the cost of multiple Game Development Computers is less than the cost
    of one large conventional, all-purpose computer. The advantage is
    that each programmer has full continuous use of the computer, with
    no "standing in line" to use the system.

The primary benefit of the GREMLIN Video Game Development Computer is
one which is difficult to understand if the user has never developed a
video game: ~~This is because~~ The system provides great efficiencies at the
creative level. The development of any video game involves a gigantic
"decision tree". This concept may be visualized as an upside-down tree,
with the trunk of the tree providing the single starting point for
"game X". As the game development progresses, the designer takes particular
"branches" every time he makes a decision about a game element. The

final game is one of many possible implementations, which on the decision
tree is one of the many "bottom" branches. The trick in efficient game
development is to take as few "false" branches as possible. Whenever
this happens (i.e. a game element is found to be inappropriate for
any reason), the designer must progress back "up" the tree and remove
the element and its effect on other elements; then persue another branch.

The Video computer allows game elements to be transferred from idea to
working ~~game system~~ prototype hardware in rapid order. This allows trial playing to assess
the value of a ~~xk~~ game element without waiting for the entire game to
be completed. Just as the "doing" of decision tree branches is easier
and faster, so is the "undoing" of unpromising approaches.

Another benefit of the short step from idea to working hardware is that
another little-understood element of game design may be fully exploited.
This element is the interactive nature of the game under development and
the designer. Many powerful game elements are discovered as the game
takes shape, rather than planned from the beginning. To fully exploit
this phenomenon, it is essential to have access to the system as a playable
game at all phases of the development. This contrasts with the conventional
approach of "finalizing" the game (even in preliminary form) before any
"play engineering" can be done.

The GREMLIN Custom Chip

The architecture used in GREMLIN video games has been optimized for low
cost without sacrificing performance in typical game implementations.
Central to this consideration is the use of dynamic RAM (Random Access
Memories) in the video system. These RAMS, due to their lowest cost per
bit ~~than~~ OF any ~~other~~ RAM technology, offer cost advantages over systems which
do not use them. Additionally, the system has been designed to use parts
which are considered in the semiconductor industry to be "low performance".
This translates into RAM costs which are far below those of competing
designs.

The GREMLIN Custom Chip provides the link between the game microprocessor
and the CRT screen. It's design is based around the dynamic RAM, so that
all of the ~~xxxxxxxx~~ design problems associated with the dynamic parts have been ~~xxxxxx~~
solved and incorporated into the chip. This helps reduce the complexity
of the game board (the chip replaces about 20 TTL integrated circuits),
and provides ~~chipxreplacementxtypexservice~~ single chip replacement of
the entire video timing system if ~~xxxxx~~ there is a failure. The chip
can be produced at virtually any ~~production~~ quantity level, providing
realistic schedules are provided about 12 weeks in advance.

Video Game Boards

These boards are essential in the game testing phase. They directly
accept the programmable memories which are created on the Game Development
Computer, and play the game identically ~~with~~ as run on the develompment
computer. These boards ~~xxuxximiixrxxxxthaxexm~~ are full capability
computers, which in addition to providing input and output meeded by
a game, also implement color. ~~Thexexhaaxdxxxaa~~ Although these boards
do not presently implement the custom chip, they are compatible with
future boards which ~~dax~~ do.

Example of a Typical Game Development

It is appropriate to itemize the elements of a ~~successful~~ game design
which are <u>not</u> provided by the GREMLIN Video Development System. These
elements are cabinet and graphics design, control panel design, and
(handwritten: or NOT VIDEO)
electronic design of the sound effects circuitry.

The interactive nature of the computer system allows a game to be character-
ized well before the end of the full development cycle. This means that
work on the three above areas can proceed in <u>parallel</u> with most of the
software development. In particular, the sound effects are created and
and made compatible with the game board outputs while the "finishing
touches" are performed to the software. The control panel and graphics
likewise can be ready at the same time as the game program is transferred
to the computer game board. This means that when the time comes for
integration of all the game parts into a prototype unit, all the elements
can be ready at the same time, with no costly waiting for one or ~~a few~~ *(handwritten: more)*
of the pieces.

This proposal assumes that the company receiving the technology from
GREMLIN has the capability to generate game concepts, design xxxxxxxxx
cabinetry and graphics, and define and implement game sound effects.

Startup Problems

It is inconceivable that technology of this high level can be immediately transferred. For this reason GREMLIN proposes a number of approaches ix toward making the transfer as fast and smooth as possible. These approaches should be considered on a non-exclusive basis, i.e. the best approach is probably some combination of the following:

1. GREMLIN will provide training at San Diego for as many people Engineers as is practical. The training will be in the use of the entire system approach. Ideally, the goal of every Engineer should be to produce the working prototype of a game, suitable for field testing.

2. GREMLIN can provide new game concepts in the form of finalized electronics, together with all system documentation which was used to produce the game. This allows analysis of a working model concurrent with manufacturing and selling the game.

3. GREMLIN can program implement new games to the customer's specification, and provide the package mentioned in item (2), i.e. working model and full development documentation.

4. Items (1) and (3) might be combined, so that the customer's game is made part of the training program.

5. GREMLIN can produce the computer cicuitry for all of the customer's games, providing a suitable specification can be agreed upon. This specification would be writted by GREMLIN after extensive technical discussion at the customer's facility.

6. GREMLIN can provide the customer with custom chips only, if the customer wishes to produce all the game electronics.

We propose:

1. Six complete Video Game Development computers. These include
    color CRT's in addition to the system B/W monitor, and provision
    for programming memory parts. $10,000 ea, total: $60,000

2. Twenty sets of electronics (game board plus power supply/audio amplifier
    for field testing and initial production (if applicable) of games
    developed on the Video Game Development Computer. $500 ea, total: $10000

3. GREMLIN factory training at the rate of $_____ per Engineer day.

4. Development of a specification for customer's custom electronics.
    Timexatxcustomerxsxfacilityxnatxtoxexceedxixweskxx
    Travel expenses to be paid by customer.
        $_____per day at customer's facility
        $_____ for generation of initial written spec by GREMLIN.

5. Custom Video IC's at the $20 ea, any quantity. Terms:_____

6. GREMLIN Engineering consulting (whenever needed) at $_____/hr,
    plus travel expenses, if applicable.

7. Exclusive license to GREMLIN game concept (fully implemented). using
    the $20,000 advance payment, 5% of game price royalty per game.

8. Customer's game concept implemented by GREMLIN. This must be quoted
    in two phases. First, GREMLIN preparing written specification for
    review/discussion based on customer input '($_____/hr). Second,
    Gremlin providing quotation on a game by game basis according to the
    specification. If necessary, game changes (both spec modification
    and programming estimates) quoted separately after game is "bought
    off" according to the written specification.

9. (what else?) Use-of-the-custom-chip payment (to defray development
    expenses)?   Nonexclusive use of Gremlin game concepts? Use of
    Gremlin concepts without working hardware (they write)?